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L1 23631 S GPC OR GEL PERMEA? CHROMATOG?
L2 68 S L1 AND (PAH OR POLYCYCLIC AROMATIC HYDROCARBON)
L3 3497 S (FOOD OR EDIBLE OR OLIVE) (9A)OIL AND CHROMATOG?
L4 64 S L3 AND (PAH OR POLYCYCLIC AROMATIC HYDROCARBON)
L5 125 S L2,L4
L6 97 S L5 AND PY<2004

=> d bib,ab 16 1-97

L6 ANSWER 1 OF 97 CA COPYRIGHT 2007 ACS on STN
AN 140:422571 CA
TI The content of benzo(A)pyrene in Slovakian smoked cheese
AU Michalski, Rajmund; Germuska, Robert
CS Institute of the Environmental Engineering of Polish Academy of
Sciences, Zabrze, Pol.
SO Polish Journal of Food and Nutrition Sciences (2003), 12(4), 33-37
AB Of **polycyclic arom. hydrocarbons (PAHs)** present in food, benzo(a)pyrene
(B(a)P) is the most often detd. compd. as a surrogate for all **PAHs**.
Various chromatog. procedures, including gas, liq. and thin layer
chromatog. were applied to isolate these substances from contaminated
samples. Because of the complexity of food matrixes addnl. clean up of
ext. prior chromatog. anal. is necessary. This paper describes extn. of
B(a)P from special kind of Slovakian smoked cheese by accelerated
solvent extn. (ASE), clean up by **gel permeation chromatog. (GPC)** and
finally detn. of B(a)P by high performance liq. chromatog. (HPLC) with
fluorescence detector in 430 nm. The influence of parameters such as:
sample prepn. as well as smoking time and temp. on the concn. of B(a)P
in smoked cheese was investigated. The method allows detn. of B(a)P in
smoked cheese on $\mu\text{g/kg}$ level. The content of B(a)P in the analyzed
smoked cheese samples ranged from $<0.1 \mu\text{g/kg}$ to $3.8 \mu\text{g/kg}$ and strongly
depended on time and temp. of processing. In most cases, the concn. of
B(a)P in samples of cheese from home-made ovens was over acceptable
limit.

L6 ANSWER 5 OF 97 CA COPYRIGHT 2007 ACS on STN
AN 139:337061 CA
TI Automated preparation of **PAH** samples
AU Fritz, Holger; Aulwurm, Uwe
CS Joerissen GmbH, Hamburg, 21107, Germany
SO LaborPraxis (2003), 27(7/8), 34-35
LA German
AB A review. Three anal. systems, TACS, **GPC Vario**, and EVA III-1 (LCTech,
Dorfen, Germany), based on **gel permeation chromatog. (GPC)** were
presented for sample prepn. of foods in **PAH** analyses. The anal. systems
were compared and compatibility of the sample glasses were discussed.

L6 ANSWER 10 OF 97 CA COPYRIGHT 2007 ACS on STN
AN 138:286217 CA
TI Solid-phase clean-up in the liquid **chromatographic** determination of

polycyclic aromatic hydrocarbons in edible oils

- AU Barranco, A.; Alonso-Salces, R. M.; Bakkali, A.; Berrueta, L. A.; Gallo, B.; Vicente, F.; Sarobe, M.
- CS Faculty of Sciences, Department of Analytical Chemistry, University of the Basque Country, Bilbao, E-48080, Spain
- SO Journal of Chromatography, A (2003), 988(1), 33-40
- AB A solid-phase extn. (SPE) method for sample clean-up, followed by reversed-phase high-performance liq. **chromatog.** (HPLC) with fluorescence detection is reported for the detn. of **polycyclic arom. hydrocarbons (PAHs)** in **edible oils**. The effects of exptl. variables, such as washing and elution solvents, sample solvent and drying time have been studied using C18 cartridges. Recoveries and selectivity using other sorbent materials (C8, C2, CH, PH and NH2) were also examd., with C18 being the best one. The recoveries ranged between 50 and 103% depending on the mol. mass of the **PAH**. The limits of quantitation were lower than 1 ng/g for most **PAHs** and good precision was achieved. The method was validated using certified ref. materials.
- L6 ANSWER 11 OF 97 CA COPYRIGHT 2007 ACS on STN
- AN 138:267008 CA
- TI Determination of nitrated **polycyclic aromatic hydrocarbons** and their precursors in biotic matrices
- AU Dusek, Bohuslav; Hajslova, Jana; Kocourek, Vladimir
- CS Department of Food Chemistry and Analysis, Institute of Chemical Technology, Prague, 166 28, Czech Rep.
- SO Journal of Chromatography, A (2002), 982(1), 127-143
- AB Anal. method for the detn. of ultra-trace levels of nitro-**PAHs** in various biotic matrixes has been developed. Soxhlet extn. and/or solvent extn. enhanced by sonication were used for isolation of target analytes; **GPC** followed by SPE were employed for purifn. of crude exts. GC-MS/NCI technique was utilized for identification/quantitation of target analytes. Performance characteristics of implemented method were obtained through thorough inhouse validation procedure. The main sources of uncertainties were critically evaluated, possible strategies of their elimination/minimization were considered and consequently employed. Examn. of real-life samples of various foodstuffs (complete human diet; mate tea, pumpkin seed oil, parsley, sausages) was performed in this study.
- L6 ANSWER 13 OF 97 CA COPYRIGHT 2007 ACS on STN
- AN 138:84657 CA
- TI Comparison of various extraction techniques for the determination of **polycyclic aromatic hydrocarbons** in worms
- AU Mooibroek, D.; Hoogerbrugge, R.; Stoffelsen, B. H. G.; Dijkman, E.; Berkhoff, C. J.; Hogendoorn, E. A.
- CS Laboratory of Organic-Analytical Chemistry, National Institute of Public Health and the Environment (RIVM), Bilthoven, 3720 BA, Neth.
- SO Journal of Chromatography, A (2002), 975(1), 165-173
- AB Two less laborious extn. methods, viz. (i) a simplified liq. extn. using light petroleum or (ii) microwave-assisted solvent extn. (MASE), for the anal. of **polycyclic arom. hydrocarbons (PAHs)** in samples of the compost worm *Eisenia andrei*, were compared with a ref. method. After extn. and concn., anal. methodol. consisted of a cleanup of (part) of the ext.

with high-performance **gel permeation chromatog.** (HPGPC) and instrumental anal. of 15 **PAHs** with reversed-phase liq. chromatog. with fluorescence detection (RPLC-FLD). Comparison of the methods was done by analyzing samples with incurred residues (n=15, each method) originating from an expt. in which worms were exposed to a soil contaminated with **PAHs**. Simultaneously, the performance of the total lipid detn. of each method was established. Evaluation of the data by means of principal component anal. (PCA) and anal. of variance (ANOVA) revealed that the performance of the light petroleum method for both the extn. of **PAHs** (concn. range 1-30 ng/g) and lipid content corresponds very well with the ref. method. Compared to the ref. method, the MASE method yielded somewhat lower concns. for the less volatile **PAHs**, e.g., dibenzo[ah]anthracene and benzo[ghi]perylene and provided a significant higher amt. of co-extd. material.

L6 ANSWER 14 OF 97 CA COPYRIGHT 2007 ACS on STN
AN 137:336858 CA
TI Extraction of benzo[a]pyrene from mussel tissue by accelerated solvent extraction (ASE) and determination by **GPC** and HPLC
AU Michalski, R.; Germuska, R.
CS Institute of Environmental Engineering, Polish Academy of Science, Zabrze, 41-819, Pol.
SO Acta Chromatographica (2002), 12, 234-241
AB During the last three decades contamination of food by traces of toxic substances has been the subject of intensive research in food toxicol. Several classes of compd. of different origin have been detected in food and beverages. Polynuclear arom. hydrocarbons (**PAH**) have attracted particular attention, because of their mutagenic and cancerogenic properties. **PAH** in food are only a part of the general problem of **PAH** pollution in the environment. The numerous types of **PAH** - approx. 100 have been isolated and identified in food and in the environment - are a challenge to modern anal. techniques. Chromatog. procedures including gas, liq., and thin-layer chromatog. have been used to isolate these substances from contaminated samples. Because of the complexity of food matrixes, the presence of substances that interfere with the extn. process or with the sepn. and identification of the **PAH** might necessitate addnl. clean-up of exts. before anal. This paper describes the extn. of benzo[a]pyrene from mussel tissue by accelerated solvent extn. (ASE), clean-up by **gel-permeation chromatog.** (GPC), and detn. by high-performance liq. chromatog. (HPLC) with fluorescence detection.

L6 ANSWER 15 OF 97 CA COPYRIGHT 2007 ACS on STN
AN 137:92890 CA
TI Use of **gel permeation chromatography** for the determination of organic pollutants in malting barley
AU Horak, Tomas; Jurkova, Marie; Culik, Jiri; Cejka, Pavel; Kellner, Vladimir
CS Pivovarsky Ustav Praha, VUPS a.s., Prague, 120 44, Czech Rep.
SO Kvasny Prumysl (2002), 48(3), 58-61
LA Czech
AB A **gel permeation chromatog.** method was developed for the detn. of 9 **polycyclic arom. hydrocarbons (PAH; benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, dibenzo(a,h)**

anthracene, indeno(1,2,3-cd)pyrene, dibenzo(a,i)pyrene, dibenzo(a,h)pyrene) and 7 polychlorinated biphenyl congeners (PCB; 28, 52, 101, 118, 138, 153, 180) in vegetable matrixes, esp. in barley and malt. The sample prepn. requires only 1 extn. step. The assay involves sample extn., ext. purifn. by **gel permeation chromatog.** on styrenedivinylbenzene column (Bio-Beads SX-3). The purified ext. has sufficient purity for the detn. of **PAH** by reversed-phase HPLC and PCB by capillary GC with electron capture detector. The analytes can be detd. in μg amts. with relative std. deviation of <25%. Chromatograms for malting barley samples spiked with all detd. compds. are provided.

L6 ANSWER 17 OF 97 CA COPYRIGHT 2007 ACS on STN

AN 135:18691 CA

TI On-line solvent evaporator for coupled normal phase-reversed phase high-performance liquid **chromatography** systems: heavy **polycyclic aromatic hydrocarbons** analysis

AU Moret, Sabrina; Cericco, Vani; Conte, Lanfranco S.

CS Department of Food Science, University of Udine, Udine, 33100, Italy

SO Journal of Microcolumn Separations (2001), 13(1), 13-18

AB An online system for coupling a normal phase liq. **chromatog.** (LC) column to a reversed-phase LC column is described. The interface consists of an online solvent evaporator working on the principles of concurrent eluent evapn. and vapor overflow, and two addnl. 10 port valves. Optimization of the online procedure as well as recoveries, repeatability and linearity characteristics were tested in a simplified system simulating detn. of heavy **polycyclic arom. hydrocarbons** in **edible oils**. An application on a real extra virgin **olive oil** sample is also reported.

L6 ANSWER 19 OF 97 CA COPYRIGHT 2007 ACS on STN

AN 134:284819 CA

TI Concentrations and distribution of some polychlorinated biphenyls (PCBs) and **polycyclic aromatic hydrocarbons** (PAHs) in an ombrotrophic peat bog profile of Switzerland

AU Berset, J. D.; Kuehne, P.; Shotyk, W.

CS Institute of Environmental Protection and Agriculture (IUL), Bern, CH-3003, Switz.

SO Science of the Total Environment (2001), 267(1-3), 67-85

AB An efficient method was developed to analyze selected polychlorinated biphenyls (PCB) and **polycyclic arom. hydrocarbons** (PAH) in dry peat samples. This method includes a shaking extn. using acetone and hexane followed by purifn. of the crude ext. by **gel permeation chromatog.** (GPC); this turned out to be the key clean-up step. The method detd. 7 indicator PCB and 16 EPA-**PAH** in individual sections of an ombrotrophic peat core in southwest Switzerland. Max. PCB concns. ($19 \mu\text{g} \sum \text{PCB/kg-dm}$) were obsd. at a peat depth of 10-15 cm, which was estd. to correspond to a time period of 1976-1960. The **PAH** profile showed a max. ($2853 \mu\text{g} \sum \text{PAH/kg-dm}$) at a depth of 20-25 cm, which represents approx. 1951-1930. Compared to these maxima, **PAH** concns. in the top layer (1990-1986) were 6 times lower, but the PCB decline was only 38%. Conc. profiles were generally consistent with known changes in pollutant emissions, and suggested more detailed studies of ombrotrophic peat bog profiles could be used for detailed reconstructions of changing atm. fluxes of these and other org. pollutants.

L6 ANSWER 20 OF 97 CA COPYRIGHT 2007 ACS on STN
AN 134:16685 CA
TI Application of **gel permeation chromatography** and HPLC method with
fluorescence detector to determination of benzo(A)pyrene in food samples
AU Germuska, R.; Michalski, R.
CS State Veterinary Institute, Dolny Kubin, 026 01, Slovakia
SO Central European Journal of Public Health (2000), 8(Suppl.), 92-93
AB During the last three decades contamination of food by traces of toxic
substances has been the object of intensive research in modern food
toxicol. Various classes of compds. of different origin were detected
in food and beverages. In particular nitrosamines and polynuclear arom.
hydrocarbons attracted attention, due to their mutagenic and
cancerogenic potential (1, 2). Traces of **PAHs** have been detected in
many **foods**, including vegetables, vegetable **oils**, fruits, grains, sea
food, grilled and roasted meat, smoked fish, coffee and tea. **PAHs** in
food are only a part of the general problem of **PAH** pollution in the
environment. The numerous types of **PAHs** - some 100 have been isolated
and identified in food and in the environment - are a challenge to
modern anal. technique. Various **chromatog.** procedures, including
column, paper and thin layer **chromatog.** have been applied to isolate
these substances from contaminated samples. Some of these methods give
satisfactory results, esp. in the detn. of single **PAHs** including benzo
(a)pyrene (3). Gas **chromatog.** and HPLC are the techniques most widely
used to meet these anal. demands. Very important are pretreatment of
food samples and clean-up procedures. In Slovakia limits for B(a)P in
food are: 0.001 mg/kg in smoked meat and fish products; 0.003 mg/kg in
paprika, pepper, sausages. Other **PAHs** (from US EPA 16 **PAH**) have no
limits. This paper describes detn. of benzo(a)pyrene in different food
samples by **gel permeation chromatog.** and the HPLC method with a
fluorescence detector. State Veterinary Institute (SVU) in Dolny Kubin
(Slovakia) is authorized for detn. of benzo(a)pyrene in all samples,
which are imported to Slovakia. Many samples with excessive of benzo(a)
pyrene were from Baltic Sea (esp. smoked sprats).

L6 ANSWER 22 OF 97 CA COPYRIGHT 2007 ACS on STN
AN 133:163175 CA
TI **Polycyclic aromatic hydrocarbons** in edible fats and oils: occurrence and
analytical methods
AU Moret, S.; Conte, L. S.
CS Via Marangoni 97, Department of Food Science, University of Udine,
Udine, 33100, Italy
SO Journal of Chromatography, A (2000), 882(1+2), 245-253
AB This review, with 51 refs., deals with anal. methods for **polycyclic
arom. hydrocarbon (PAH)** detn. in oils and fats. The data reported in
the introduction deal with **PAH** dietary intake from this group of food
and contamination levels recently found by some authors in different
vegetable oils, stressing the importance of establishing a method
suitable for routine analyses. Traditional sample prepn. relies on
tedious, time-consuming procedures. They generally consist of an extn.
step (liq.-liq. partition, caffeine complexation, sapon.) followed by
one or more purifn. procedures (column **chromatog.**, thin-layer
chromatog., solid-phase extn.). The anal. detn. is usually carried out

by HPLC and spectrofluorometric detection, or through high-resoln. capillary GC coupled to flame ionization detection or mass spectrometry. LC is a valid alternative to the traditional sample prepn., and off-line LC-LC allows performing an accurate **PAH** anal. in <2 h. Also supercrit. fluid extn., allowing performing both extn. and clean-up in one combined step, is a promising technique. Hyphenated techniques such as LC-GC and LC-LC-GC seem to be very promising. A completely online method for alkylated **PAH** detn. in oils or lipidic exts. contaminated with mineral oil involves a two-dimensional LC-step with intermediate eluent evapn. and GC transfer through a vaporizer/overflow interface.

L6 ANSWER 23 OF 97 CA COPYRIGHT 2007 ACS on STN

AN 132:312607 CA

TI Analysis of **polycyclic aromatic hydrocarbons** and their nitro-derivatives in farm road and barn dust

AU Ciganek, M.; Neca, J.; Machala, M.; Raszyk, J.

CS Veterinary Research Institute, Brno, 62132, Czech Rep.

SO Toxicological and Environmental Chemistry (1999), 72(3-4), 183-194

AB Road and barn dust samples were analyzed for **polycyclic arom. hydrocarbons (PAHs)** and nitrated polycyclic hydrocarbons (nitro-**PAHs**). For this purpose, suitability of optimized HPLC with fluorimetric detection and GC/MS, both preceded by Soxhlet extn. of samples, **gel permeation chromatog.** and HPLC with silica gel column for clean-up, fractionation and preconcn. of the analytes, were compared. The detection limits of GC/MS for 16 **PAHs** ranged from 5 to 10 pg. The detection limits of GC/MS for 11 nitro-**PAHs** ranged from 20 to 60 pg and those of online redn. HPLC with fluorescence detection from 0.5 to 5 pg. Therefore, procedures with a higher sepn. efficiency and a more selective detection, such as GC/MS should be preferred when low concns. of nitro-**PAHs** are expected. **PAH** concns. in road dust and barn dust samples ranged from 527 to 5680 $\mu\text{g/kg}$, and from 114 to 740 $\mu\text{g/kg}$, resp. Nitro-**PAHs** were detected in one sample of barn dust and two samples of road dust. The concns. of 2-nitrofluorene, 1-nitropyrene, and 6-nitrochrysene in barn dust were 0.50, 0.72 and 1.25 $\mu\text{g}\cdot\text{kg}^{-1}$, resp. Only 1-nitropyrene at concns. of 0.11 and 0.29 $\mu\text{g}\cdot\text{kg}^{-1}$ was detected in road dust. As far as we known, this is the first report on the occurrence of nitro-**PAHs** in the farm environment.

L6 ANSWER 27 OF 97 CA COPYRIGHT 2007 ACS on STN

AN 130:157856 CA

TI Determination of polyaromatic hydrocarbons and some related compounds in industrial waste oils by **GPC-HPLC-UV**

AU Nerin, C.; Domeno, C.

CS Centro Politecnico Superior, Department of Analytical Chemistry, University of Zaragoza, Zaragoza, 50015, Spain

SO Analyst (Cambridge, United Kingdom) (1999), 124(1), 67-70

AB The detn. of polyarom. hydrocarbons (**PAH**) in industrial waste oils was studied. The optimized procedure consisted in using low pressure **gel permeation chromatog.** to sep. the fraction contg. **PAH** and polychlorinated biphenyls (PCB) from the matrix. Both groups of pollutants were further fractionated on a small column of 3% deactivated Al_2O_3 , using hexane to elute the PCB fraction, then hexane-dichloromethane (95 +5) to elute **PAH**. Final anal. was conducted by HPLC

on a 2(1-pyrenyl)ethyldimethylsilica column with hexane as mobile phase in the isocratic mode and with UV detection at 3 wavelengths, to quantify 16 priority **PAH**. Recoveries were 89-99%. Four different industrial waste oil samples were analyzed and results are discussed.

L6 ANSWER 33 OF 97 CA COPYRIGHT 2007 ACS on STN

AN 127:69843 CA

TI Determination of **PAH** in airborne particulates using **gel permeation chromatography** and HPLC-fluorescence-UV

AU Wu, J. C. Gaston; Chang, M. G.

CS Department Chemistry, National Taiwan Normal University, Taipei, 11718, Taiwan

SO Journal of Environmental Science and Health, Part A: Environmental Science and Engineering & Toxic and Hazardous Substance Control (1997), A32(5), 1525-1556

AB A method based on **gel permeation chromatog.** as sample clean-up followed by HPLC - Fluorescence - UV is successfully developed for measuring the contents of 16 **PAHs** in airborne particular after Soxhlet extn. or the samples. The clean-up process is proved to be efficient by the anal. of SRM from NIST. The HPLC is operated at gradient steps with const. flow followed by UV and optimized multi-step fluorescence detection. A complete run of HPLC requires less than 30 min with satisfactory resolu. The detection limits obtained with UV detection ranged from 0.017 to 2.542 ng/m³, and those of fluorescence were from 0.001 to 0.044 ng/m³. Precision of measurement is within 9.0%. This method is applied to monitor the **PAH** contents in the airborne particulate samples collected in Taipei city at ten different sampling sites with particle size distribution measurements. Concns. of naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene pyrene, benzo[a]anthracene, chrysene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene, dibenzo[a,h]anthracene, benzo[g,h,i]perylene, and indeno[1,2,3-cd]pyrene were monitored.

L6 ANSWER 35 OF 97 CA COPYRIGHT 2007 ACS on STN

AN 126:46409 CA

TI Determination of **polycyclic aromatic hydrocarbons** in **edible oils** and fats by online donor-acceptor complex **chromatography** and high-performance liquid **chromatography** with fluorescence detection

AU van Stijn, F.; Kerkhoff, M. A. T.; Vandeginste, B. G. M.

CS Unilever Research Laboratory, Olivier van Noortlaan 120, AT Vlaardingen, 3133, Neth.

SO Journal of Chromatography, A (1996), 750(1+2, 4th International Symposium on Hyphenated Techniques in Chromatography and Hyphenated Chromatographic Analyzers, 1996), 263-273

AB Various off-line methods for clean-up and sample enrichment are available for the anal. of **polycyclic arom. hydrocarbons (PAHs)** in **edible oils** and fats. These methods consist of laborious and time consuming procedures. This study reports an online method using LC-LC coupling. After clean-up of the sample on a donor-acceptor complex **chromatog.** (DACC) column the **PAHs** are transferred to and sepd. on an anal. HPLC column. Quantification is carried out with fluorescence detection. The DACC column clean-up is fast and is carried out during the HPLC run of the previous sample. Compared to the traditional

methods this automated online method saves considerable time and significantly reduces the amt. of solvent waste. The method uses common HPLC equipment and its performance has been evaluated.

L6 ANSWER 38 OF 97 CA COPYRIGHT 2007 ACS on STN
AN 124:315277 CA
TI Simplified extraction and cleanup procedure for the determination of **PAHs** in fatty and protein-rich matrixes
AU Cejpek, K.; Hajslova, J.; Jehlickova, Z.; Merhaut, J.
CS Dep. Food Chemistry, Inst. Chem. Technol., Prague, 166 28, Czech Rep.
SO International Journal of Environmental Analytical Chemistry (1995), 61 (1), 65-80
AB A simplified anal. procedure for the detn. of 12 priority **polycyclic arom. hydrocarbons** (phenanthrene, anthracene, fluoranthene, pyrene, benz(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, dibenz(a,h)anthracene, benzo(ghi)perylene and indeno(1,2,3-cd)pyrene) in meat products and other biol. materials has been developed. As a first step, ultrasonic extn. with chloroform for isolation of analytes was used. **Gel permeation chromatog.** on Bio-Beads S-X3 utilizing chloroform as mobile phase was applied to remove interferences (lipids, pigments etc.). HPLC with fluorescence detection was employed for quantitation of analytes. Recoveries at a $\mu\text{g/kg}$ spiking level ranged from 53% (phenanthrene) to 112% (benzo(k)fluoranthene) with relative std. deviations in the range of 15% (benzo(k)fluoranthene) to 49% (anthracene).

L6 ANSWER 39 OF 97 CA COPYRIGHT 2007 ACS on STN
AN 124:254931 CA
TI A method for analyzing **polycyclic aromatic hydrocarbons (PAHS)** in plant samples
AU Kaupp, Heike; Sklorz, Martin
CS Univ. Bayreuth, Bayreuth, 95440, Germany
SO Chemosphere (1996), 32(5), 849-54
AB A method was developed for the cleanup of corn samples prior to **PAH** anal. The cleanup consists of 2 steps: **gel permeation chromatog.** on a porous styrene/divinylbenzene copolymer (Bio Beads SX8) and further cleanup on silica gel. Quantification was performed with high resolu. gas chromatog./high resolu. mass spectrometry (HRGC/HRMS) by using deuterated internal stds. The recoveries for a ^{12}C -**PAH** std. mixt. of 14 compds. were approx. 100% except for perylene and indeno(1,2,3-cd)pyrene. The anal. of three samples of maize leaves, each in parallel, gave highly reproducible results. In no case were interferences during the HRGC/HRMS measurements obsd. The cleanup method is therefore regarded as very effective, reproducible, relatively inexpensive and sufficiently fast.

L6 ANSWER 44 OF 97 CA COPYRIGHT 2007 ACS on STN
AN 122:88873 CA
TI Organic analytical characterization of marine matrixes of the German Environmental Specimen Bank
AU Schlodot, J. D.; Duerbeck, H. W.; Oxyenos, K.
CS Research Centre Juelich (KFA), Institute Applied Physical Chemistry, Germany

SO Bilateral Seminars of the International Bureau (1994), 19 (GERMAN-EGYPTIAN SEMINAR ON ENVIRONMENTAL RESEARCH, 1ST, 1994), 205-28

AB During investigations on the occurrence and distribution of contaminants in coastal organisms of the North Sea and the Baltic organochlorine compds. such as hexachlorobenzene (HCB), octachlorostyrene (OCS), hexachlorocyclohexane isomers (HCH), dichlordiphenyltrichloroethane (p,p'-DDT) and its metabolites, polychlorinated biphenyls (PCBs), **polycyclic arom. hydrocarbons (PAHs)** such as benzo(e)pyrene or perylene, and heavy metals (Hg, Cd, Pb) were detd. in selected algae species, blue mussels, fish, and herring gull eggs. Organochlorine compds. were detd. by high-performance liq. chromatog. (HPLC) and **gel permeation chromatog. (GPC)** with electron capture detector after sample pre treatment and clean up. Evaluation of the data from the program made obvious significant geog. differences in the levels and the pattern with regard to the substances involved. For HCB, OCS and Hg a crucial point of contamination within the German Bight (Isle of Trischen) was recognized that was apparently influenced to a large extent by the inflow of waters from the Elbe.

L6 ANSWER 45 OF 97 CA COPYRIGHT 2007 ACS on STN

AN 121:220693 CA

TI Method of measuring content of polycyclic aromatic compound in lanolin and removal thereof

IN Myojyo, Katsunori; Sato, Mikinobu; Nemoto, Hiromitsu

PA Yoshikawa Oil and Fat Co., Ltd., Japan

SO PCT Int. Appl., 50 pp.

PI WO 9416322 A1 19940721 WO 1994-JP10 19940107

EP 632267 A1 19950104 EP 1994-904003 19940107

PRAI JP 1993-36033 A 19930112

AB The invention provides a method of measuring the content of polycyclic arom. compds. (**PAH**) remaining in lanolin, which comprises sepg. and concg. the **PAH** by **gel permeation chromatog.** using a styrene-divinylbenzene copolymer and detg. the concd. **PAH** by HPLC with a fluorometric detector; a method of removing the remaining **PAH**, which comprises measuring the **PAH** removal activity of active carbon by the above measuring method thereby select the optimum adsorption condition and calcg. the amt. of the active carbon required for lowering the **PAH** content, and mixing the required amt. of active carbon with lanolin to thereby effect specific adsorption of the **PAH** onto the active carbon; and a method of removing the **PAH** remaining in wool grease or lanolin by the vacuum distn. of the grease or lanolin under specified conditions either directly or after being treated with a borate and, if necessary, obtaining various lanolin derivs. from the treated wool grease or lanolin.

L6 ANSWER 46 OF 97 CA COPYRIGHT 2007 ACS on STN

AN 121:155999 CA

TI Trace enrichment and HPLC analysis of **PAHs** in **edible oils** and fat products, using liquid **chromatography** on electron acceptor stationary phases in connection with reverse phase and fluorescence detection

AU Perrin, J. L.; Poirot, N.; Liska, P.; Hanras, C.; Thienpont, A.; Felix, G.

CS Inst. des Corps Gras, Bordeaux-Pessac, F33600, Fr.

SO Polycyclic Aromatic Compounds (1993), 3(SUPPL.), 337-46

AB **Polycyclic arom. hydrocarbons (PAHs)** are detd. in **edible oils** and fats by donor-acceptance complex **chromatog.** followed by reversed-phase **chromatog.** and programmed fluorescence detection. This procedure takes 2 h and can be automated.

L6 ANSWER 47 OF 97 CA COPYRIGHT 2007 ACS on STN

AN 121:127180 CA

TI Analysis of **polycyclic aromatic hydrocarbons** in fish tissue

AU Chu, Shaogang; Xu, Xiaobai

CS Res. Cent. Eco-Environ. Sci., Chinese Acad. Sci., Beijing, 100085, Peop. Rep. China

SO Huanjing Kexue Xuebao (1994), 14(2), 229-35

LA Chinese

AB A method is described for the detn. of **polycyclic arom. hydrocarbons (PAHs)** with 2-5 rings) in fish tissue. The anal. procedure includes the following steps: sapon., extn., column chromatog. on alumina, clean-up with **gel permeation chromatog.**, gas chromatog. and high performance liq. chromatog. with UV and fluorescence detectors. The recoveries ranged from 60% to 98% for **PAHs** and the detection limit is 0.1 ppb. Results of fish samples are presented. One of the samples comes from a reservoir and the other comes from a fishing ground.

L6 ANSWER 49 OF 97 CA COPYRIGHT 2007 ACS on STN

AN 120:132525 CA

TI Comparison of two clean-up methodologies for the gas **chromatographic**/mass spectrometric determination of low nanogram/gram levels of polynuclear aromatic hydrocarbons in seafood

AU Nyman, Patricia J.; Perfetti, Gracia A.; Joe, Frank L., Jr.; Diachenko, Gregory W.

CS Div. Prod. Manufact. Use, Food Drug Adm., Vashington, DC, 20204, USA

SO Food Additives and Contaminants (1993), 10(5), 489-501

AB The Mar. 1989 **oil** spill in Alaska prompted the **Food** and Drug Administration (FDA) to conduct a thorough investigation of clean-up methodologies aimed at detg. low ng/g (ppb) levels of polynuclear arom. hydrocarbons (**PAHs**) in seafood. The clean-ups from a modified FDA method and a National Marine Fisheries Service (NMFS) method were evaluated on the basis of the detn. of 18 **PAHs** at levels ranging from 1 to 5 ppb by gas **chromatog.**/mass spectrometry. In the modified FDA method, seafood exts. were purified by a liq.-liq. partition followed by a three-step elution through silica, alumina, and C18 solid-phase extn. cartridges. In the NMFS method, seafood exts. were purified by column **chromatog.** through a deactivated silica gel/alumina column and a gel permeation high performance liq. **chromatog.** column. Both methods quantitated 18 **PAHs** at levels ranging from 1 to 5 ppb. With the exception of naphthalene, av. recoveries based on internal deuterated stds. ranged from 73 to 144% for the modified FDA method and 63 to 106% for the NMFS method.

L6 ANSWER 50 OF 97 CA COPYRIGHT 2007 ACS on STN

AN 119:285496 CA

TI Automated environmental extract cleanup with the BenchMate workstation

AU Kern, Richard A.; O'Mara, Kevin; Yaikow, Shirley; Cercone, Louis J.;

Andersen, Eric; Moore, Lisa; Cava, Mark
 CS Midwest Anal. Serv., Detroit, MI, 48201, USA
 SO Laboratory Robotics and Automation (1992), 4(4), 197-202
 AB Presented are: (1) automated cleanup methods, (2) automatic log of sample handling, (3) GC/MS results for analytes of interest. The BenchMate workstation applications examd. are: (A) PCB cleanup, (B) traditional GPC cleanup and (C) high-pressure GPC cleanup. Environmental exts. were analyzed for semivolatiles, pesticides, PAHs, and PCBs in waste oils. The BenchMate performed weighing, diln., filtration, and injection for GPC cleanup and Florisil cartridge/acid cleanup for PCBs.

L6 ANSWER 53 OF 97 CA COPYRIGHT 2007 ACS on STN
 AN 118:93570 CA
 TI Use of offline **gel permeation chromatography**-normal-phase liquid chromatography for the determination of polycyclic aromatic compounds in environmental samples and standard reference materials (air particulate matter and marine sediment)
 AU Fernandez, Pilar; Bayona, Josep M.
 CS Environ. Chem. Dep., CID (CSIC), Jordi Girona Salgado 18, Barcelona, 08034, Spain
 SO Journal of Chromatography (1992), 625(2), 141-9
 AB A method involving two levels of fractionation, semipreparative **gel permeation chromatog.** (GPC) and normal-phase liq. chromatog. (NP-LC), and capillary gas chromatog. with flame ionization and nitrogen-phosphorus detection coupled with mass spectrometry, was developed for the detn. of polar substituted arom. compds. (PACs) in environmental matrixes. A GPC clean-up procedure (BioBeads SX-12-dichloromethane) efficiently removed lipidic matter from org. exts., yielding an enriched PAC fraction. NP-LC (μ Porasil) of that fraction provided a selectivity based on chem. classes and moderate to high recoveries for std. PAC. The application of this method to environmental samples and ref. materials, air particulate matter (NIST 1649) and marine sediment (HS-4), demonstrated the validity of the procedure for the detn. of **polycyclic arom. hydrocarbons (PAHs)** from both qual. and quant. points of view. Further, a variety of arom. ketones, quinones and aldehydes (oxy-PAHs) were detd. in both matrixes.

L6 ANSWER 57 OF 97 CA COPYRIGHT 2007 ACS on STN
 AN 116:45524 CA
 TI Vapor-particle partitioning of hydrocarbons in Western Mediterranean urban and marine atmospheres
 AU Albaiges, Joan; Bayona, Josep M.; Fernandez, Pilar; Grimalt, Joan; Rosell, Antoni; Simo, Rafael
 CS Environ. Chem. Dep., CID, Barcelona, E-08034, Spain
 SO Mikrochimica Acta (1991), 104(1-6), 13-27
 AB An anal. procedure is described for a comprehensive detn. of the compn. of hydrocarbons in the atm., based on: (1) aerosol filtration and subsequent adsorption of the vapor phase onto activated charcoal and polyurethane foam; (2) GPC (**gel-permeation chromatog.**) and HPLC fractionation of the exts.; and (3) anal. of the fractions by GC-mass spectrometry under electron ionization and neg.-ion chem.-ionization modes. Special emphasis is placed on n-alkanes, PAHs, and their

oxygenated derivs. The characterization of samples collected in a coastal urban area (Barcelona), and far away over the Western Mediterranean, at sea level and at 1100 m of altitude, showed significant changes in the aerosol compn., mainly attributed to initial vapor-particle partitioning processes, influenced by ambient temp. variations, and to others taking place during long-range atm. transport, related with the different compd. photoreactivities and with an unexplained source-decoupling phenomenon.

L6 ANSWER 60 OF 97 CA COPYRIGHT 2007 ACS on STN

AN 115:107926 CA

TI Determination of monocyclic and **polycyclic aromatic hydrocarbons** in fish tissue

AU Lebo, Jon A.; Zajicek, Jim L.; Schwartz, Ted R.; Smith, Lawrence M.; Beasley, Mary P.

CS Natl. Fish. Contam. Res. Cent., U. S. Fish Wildl. Serv., Columbia, MO, 65201, USA

SO Journal - Association of Official Analytical Chemists (1991), 74(3), 538-44

AB An anal. method is presented in which fish tissue is analyzed for neutral monocyclic and **polycyclic arom. hydrocarbons** (AHs) and arom. sulfur heterocycles (ASHs) by capillary column gas chromatog. (CGC) with photoionization detection. The sample enrichment procedure includes sapon. with aq. KOH, acidification of the digestates, and extn. of the arom. compds. into cyclopentane-dichloromethane. Adsorption chromatog. on tandem segments of potassium silicate and silica gel removes 99% of the coexd. lipid. Final enrichment by **gel permeation chromatog.** eliminates residual biogenic material and potentially interfering alkanes. Relatively volatile monoaroms. are included among the analytes by virtue of the efficiency of the complementary enrichment steps, the use of small quantities of only low-boiling solvents, and the selectivity of the detector. Most targeted compds. (AHs ranging in size from C3-alkylbenzenes through benzo[g,h,i]perylene and ASHs within the same size range) can be detd. in 5-g (wet wt.) samples of fish tissue at concns. as low as 20 ng/g. Comparisons are made of recoveries of selected AHs under ordinary and gold fluorescent lighting conditions.

L6 ANSWER 66 OF 97 CA COPYRIGHT 2007 ACS on STN

AN 109:185024 CA

TI Determination of polycyclic aromatic compounds in fish tissue

AU Birkholz, Detlef A.; Coutts, Ronald T.; Hrudef, Steve E.

CS Enviro-Test Lab., Edmonton, AB, T6E 0P5, Can.

SO Journal of Chromatography (1988), 449(1), 251-60

AB A method is presented for the anal. of **polycyclic arom. hydrocarbons** (**PAHs**), polycyclic arom. sulfur heterocycles (**PASHs**), and basic polycyclic arom. nitrogen heterocycles (**PANHs**) in fish. The anal. procedure includes Soxhlet extn. of prepd. fish tissue with methylene chloride followed by **gel permeation chromatog. (GPC)** using Bio-beads SX-3. For **PAHs/PASHs**, further cleanup is performed using adsorption chromatog. on Florisil (5% water deactivated) and elution with hexane. For basic **PANHs** further cleanup of the fish exts. after **GPC** is achieved using liq.-liq. partitioning with 6M HCl and chloroform and then basifying the aq. phase and extg. it with chloroform. Anal. of

fortified fish samples was performed using capillary gas chromatog. with flame ionization detection and capillary gas chromatog.-mass spectrometry. Good agreement was obsd. for both methods of anal. when applied to fish samples fortified with **PAHs**, **PASHs** and basic **PANHs** at 0.1 to 1 $\mu\text{g/g}$, suggesting that the method is effective at removing interfering biogenic compds. prior to anal. Av. recovery of **PAHs**/**PASHs** from fortified fish tissue was 87% and 70% for fish tissue fortified at 0.24-1.1 and 0.024-0.11 $\mu\text{g/g}$, resp. Av. recovery for basic **PANHs** was 97% for fish fortified at 1.2-1.4 $\mu\text{g/g}$.

- L6 ANSWER 72 OF 97 CA COPYRIGHT 2007 ACS on STN
AN 105:36915 CA
TI Rapid, semimicro method for determination of **polycyclic aromatic hydrocarbons** in shellfish by automated gel permeation/liquid chromatography
AU Musial, Charles J.; Uthe, John F.
CS Halifax Fish. Res. Lab., Fish. Oceans Canada, Halifax, NS, B3J 2S7, Can.
SO Journal - Association of Official Analytical Chemists (1986), 69(3), 462-6
AB A simple, rapid, easily automated method is described for the detn. of **polycyclic arom. hydrocarbons (PAHs)** in shellfish such as American lobster (*Homarus americanus*) and blue mussel (*Mytilus edulis*). **PAHs** are extd. from small mats. (1-8 g) of tissue by sapon. in 1N ethanolic KOH followed by partitioning into 2,2,4-trimethylpentane. This soln. is evapd. just to dryness by rotary evapn. and the residue is dissolved in cyclohexane-dichloromethane (1 + 1) for **gel permeation chromatog. (GPC)** on Bio-Beads SX-3. The **GPC** procedure is ideal as a screening method in the range 25-18,000 ng **PAHs/g** tissue. If individual **PAH** measurements are required, the appropriate **GPC** fraction is collected and **PAHs** are sepd. by reversed-phase liq. chromatog. with fluorometric detection. Individual **PAHs** at concns. ≥ 0.25 -10 ng/g can be detd. Recoveries of added fluoranthene [206-44-0], pyrene [129-00-0], benz[a]anthracene (I) [56-55-3], chrysene [218-01-9], benzo[e]pyrene [192-97-2], benzo[b]fluoranthene [205-99-2], benzo[k]fluoranthene [207-08-9], benzo[a]pyrene [50-32-8], dibenz[a,h]anthracene [53-70-3], benzo[ghi]perylene [191-24-2], and indeno[1,2,3-cd]pyrene [193-39-5] were quant., with relative std. deviations ranging from 0.0 to 16.9%.
- L6 ANSWER 80 OF 97 CA COPYRIGHT 2007 ACS on STN
AN 93:130706 CA
TI Determination of **polycyclic aromatic hydrocarbons** in fat products by high-pressure liquid chromatography
AU Van Heddeghem, Andre; Huyghebaert, Andre; De Moor, Harry
CS Fac. Agric. Sci., State Univ. Ghent, Ghent, B-9000, Belg.
SO Zeitschrift fuer Lebensmittel-Untersuchung und -Forschung (1980), 171 (1), 9-13
AB The method described by C. Gertz (1978) for the extn. of 3,4-benzopyrene [50-32-8] in meat and fish products was adapted for butter, margarine, **edible oils**, and fats and extended to other **polycyclic arom. hydrocarbons (PAH)**: 1,2-benzopyrene [192-97-2], 1,2,3,4-dibenzanthracene [215-58-7], 1,2,5,6-dibenzanthracene [53-70-3], and 1,12-benzoperylene [191-24-2]. The isolated **PAH** are detd. by high-pressure liq. chromatog. on reversed-phase columns with detection by

fluorometry. Recoveries range 76-85%. The detection limit varies between 0.10 and 0.90 ppb. By application of optimized anal. conditions the sensitivity can be increased to 0.01 ppb for each compd.

- L6 ANSWER 83 OF 97 CA COPYRIGHT 2007 ACS on STN
AN 90:202298 CA
TI Determination of polynuclear aromatics in shellfish by high-pressure liquid chromatography
AU Hanus, James P.
CS Food Drug Adm., Dallas, TX, USA
SO EDRO SARAP Research Technical Reports (1978), 3, 51-67
AB A high-pressure liq. chromatog. (HPLC) procedure for detn. of 13 polynuclear arom. hydrocarbon (PAH) compds. in oysters at the 2 ppb level is described. These compds. are extd. from oysters with acetonitrile, partitioned into petroleum ether, petroleum ether is removed, and residue sapond. The aroms. are isolated by passing sapond. residue through silica gel and further purified and fractionated by μ -Styragel gel permeation chromatog. The individual PAH are then quantitated by using a reversed phase HPLC column coupled to fluorescence, spectrophotometric, and 254 nm absorbance detectors in series.
- L6 ANSWER 87 OF 97 CA COPYRIGHT 2007 ACS on STN
AN 86:100513 CA
TI Adsorption effect in GPC separation of polycyclic aromatic hydrocarbons
AU Popl, M.; Fahnrich, J.; Stejskal, M.
CS Dep. Pet. Petrochem., Inst. Chem. Technol., Prague, Czech.
SO Journal of Chromatographic Science (1976), 14(11), 537-40
AB The adsorption effect of polycyclic aroms. in the gel permeation chromatog. (GPC) system with styrene-divinylbenzene gel and benzene was investigated. From obtained data and from literature data, conclusions were drawn about the adsorption effect of parent arom. hydrocarbons. By using the mean mol. size, the possibility of calcn. of retention vols. was demonstrated by using a simple linear equation. This equation fits well for most of the GPC systems.
- L6 ANSWER 89 OF 97 CA COPYRIGHT 2007 ACS on STN
AN 83:181815 CA
TI Determination of polycyclic aromatic hydrocarbons in white petroleum products
AU Popl, Milan; Stejskal, Michal; Mostecky, Jiri
CS Inst. Chem. Technol., Prague, Czech.
SO Analytical Chemistry (1975), 47(12), 1947-50
AB Polycyclic arom. hydrocarbons (PAH) occur in white petroleum products in the ppb range accompanied by some S and polar compds. PAH were concd. by frontal elution on silica gel and sepd. from polar compds. by adsorption chromatog. on basic Al₂O₃. Final sepn. was achieved by gradient elution adsorption chromatog. on Al₂O₃ or by gel permeation chromatog. and PAH were identified using fluorescence and phosphorescence spectrometry.

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